Xerox 550 Computer System

The Xerox 550 computer system is a high-performance, microprogrammed 32-bit computer system. Supported by proven software and a new family of peripherals, the Xerox 550 is a true, multi-use computer system, optimized for the demands of the real-time world. The Xerox 550 is inherently a highly reliable system, possessing the most comprehensive array of error detection, recovery and diagnostic capabilities in its class, including self-testing microdiagnostics.

In conjunction with the Xerox Control Program for Real Time (CP-R), the Xerox 550 offers a virtually-addressed, multiprogrammed, real-time foreground environment, enhanced by a sophisticated batch and terminal pro-cessing capability for support of data analysis, program development and scientific batch requirements. High throughput and flexible configurability, with up to 16 I/O processors and 256K words of memory, allow the Xerox 550 to be tailored to meet the most stringent require-ments. Included as a standard feature, the hardware memory map provides a virtually addressed memory which assures efficient utilization of available system resources.

System Architecture
The system is organized as a series of resource pools with each pool containing a combination of system ele-ments. There are two basic types of resource pools:

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memory units and processor clusters. Each memory unit contains up to 32K words of storage, hardware write lock logic, and provides up to 6 separate and independent access paths. The processor clusters are of two types, Basic and I/O. The Basic Cluster contains a Basic Processor (arithmetic and logic unit) and a Multiplexing I/O Processor (MIOP). Each I/O Cluster contains up to three MIOPs. Processor clusters communicate with memory through independent memory paths. Centralized system functions are provided by the System Control Processor which contains control functions such as interrupts, system clock, system control panel, configuration control panel, real-time clocks, operator's console and remote assist facilities.

System Features
□ VIRTUAL MEMORY — Standard, implemented with the Xerox memory map, including access protection.
□ ADDRESSING — Direct, Indirect, Indexed.
□ FLOATING POINT — Standard, provides single and double precision.
□ MEMORY PROTECTION — Hardware lock and key.
□ GENERAL REGISTERS — 64 Standard (4 blocks of 16).
□ INTERRUPT SYSTEM — Up to 48 unique external interrupts (4 blocks of 12).
□ INDEXING — Seven index registers for each group of general registers; automatic displacement alignment facilitates handling varying data sizes.
□ CENTRALIZED SYSTEM CONTROL — Allows the full hardware and software capabilities of the system to be managed from the operator's console.
□ CLOCK SYSTEM — 4 real-time clocks standard.
□ SINGLE POINT CONFIGURATION CONTROL — Enhances redundant system utilization and maintenance operations.
□ MEMORY BUS — Up to six independent buses to memory.
□ STACK OPERATIONS — Facilitates reentrant programming.
□ AVAILABILITY/SECURITY—Comprehensive error detection reported in status registers within each system element, stratified fault localization, microdiagnostics and on-line system diagnostics.
— Full parity checking on all data transmissions
— Power failure and over-temperature detection
— System control memories include parity checking
— Control sequence error detection
— System partitioning and reconfiguration
— Automatic retry
— Two access protection mechanisms

□ REMOTE ASSIST — Expert assistance from a remote communication link to a Xerox Field Engineering Center helps reduce troubleshooting time.

Memory Specifications
□ CYCLE TIME — 645 nanoseconds.
□ WORD SIZE — 32 data bits (four 8-bit bytes) plus parity checking per byte.
□ SIZE — Up to 256K words in 16K word increments.
□ PORTS — Up to six separate paths to each memory unit.
□ INTERLEAVE — Modulo 2.

I/O Summary
□ I/O PROCESSORS — Up to 16 I/O processors operating independently of the Basic Processor, with data rates up to 1 million bytes per second per I/O processor.
□ MULTIPLEXER I/O PROCESSOR — Up to three per I/O Cluster; provides multiplexed I/O channels to and from a complete line of standard peripherals.
□ PERIPHERALS — Full line of peripherals including magnetic tapes, cartridge disks, removable disks, RADs, card equipment, line printers and communication equipment.
□ DIRECT MEMORY INTERFACE—Special-purpose devices can be interfaced directly to a memory port to provide the capability of handling I/O up to memory speeds.
□ ERROR DETECTION AND REPORTING — Each I/O processor includes extensive error detection and reporting facilities such as: bus check faults during main memory read operations; control check faults for internal MIOP operations; parity generation and/or checking for all control and data exchanges with device controllers and memory; memory address error detection; hardware detected program errors.
□ PROCESS I/O — Standard products include a complete line of analog and digital I/O interfaces.

System Software
The Xerox 550 operates under the control of the Xerox Control Program for Real Time (CP-R). CP-R is a multiuse operating system with multiprogramming real-time foreground support, concurrent with batch background processing and terminal operations. CP-R utilizes a number of language processors, including: Extended FORTRAN IV, Xerox Assembly Program, and Simulation Language-1 (SL-1).

Typical Xerox 550 System Configuration
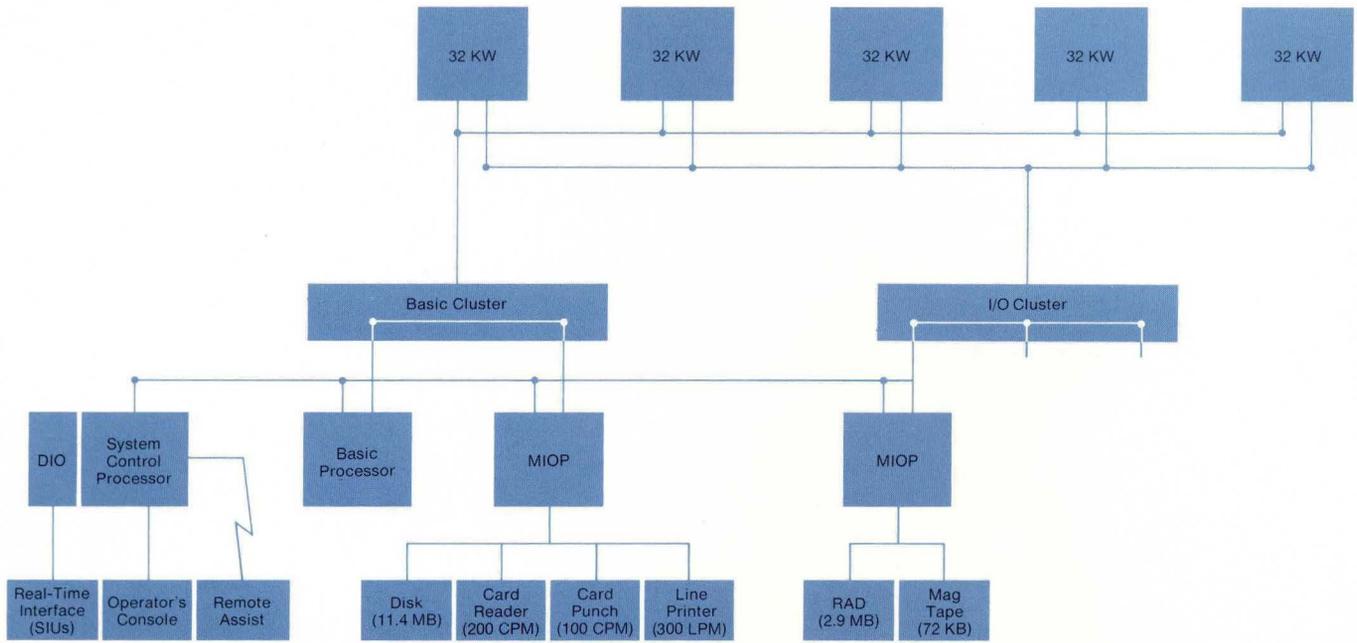
Includes 4 register blocks, memory map, memory protection, 4 real-time clocks,
power fail safe, internal priority interrupts, floating point arithmetic